

**WHAT IS CLAIMED IS:**

1. A method for the thermal treatment of a vein using a medical apparatus including an energy delivery device having an optical fiber with a diffusing light-emitting section comprising the steps of:

inserting said optical fiber having said diffusing light-emitting section into said vein at a treatment site;

emitting energy into said vein from said diffusing light-emitting section along a length of said treatment site.

2. The method for the thermal treatment of a vein using a medical apparatus according to claim 1, wherein said treatment site comprises a multiplicity of adjacent treatment segments, further comprising the step of moving said diffusing light-emitting section of said optical fiber along the length of said treatment site from one treatment segment to another.

3. The method for the thermal treatment of a vein using a medical apparatus according to claim 2, wherein said diffusing light-emitting section is moved in an incremental manner.

4. The method for the thermal treatment of a vein using a medical apparatus according to claim 2, wherein said diffusing light-emitting section is moved in a continuous manner.

5. The method for the thermal treatment of a vein using a medical apparatus according to claim 2, further comprising the step of measuring a temperature at one or more treatment segments.

6. The method for the thermal treatment of a lumen using a medical apparatus according to claim 5, wherein said optical fiber further comprises a temperature sensor at a distal end thereof, further comprising the steps of:

generating a temperature signal using said temperature sensor; and  
utilizing said temperature signal to determine said measured temperature.

7. The method for the thermal treatment of a vein using a medical apparatus according to claim 5, further comprising the step of adjusting the rate of movement in response to the temperature measurement.

8. The method for the thermal treatment of a vein using a medical apparatus according to claim 7, further comprising the step of adjusting the energy delivered to at least one treatment segment in response to the temperature measurement.

9. A method for the thermal treatment of a lumen using a medical apparatus including an energy delivery device having an optical fiber comprising the steps of:

inserting optical fiber into said lumen at a treatment site, said treatment site comprising at least two treatment segments;

aligning light-emitting section of said optical fiber with a first treatment segment within said treatment site;

emitting energy into said lumen at said first treatment segment;

measuring a temperature of said lumen at said first treatment segment;

moving light-emitting section of said optical fiber to at least a second treatment segment within said lumen;

emitting energy into said lumen at said second treatment segment; and

measuring a temperature of said lumen at said second treatment segment.

10. The method for the thermal treatment of a lumen using a medical apparatus according to claim 9, wherein said medical apparatus includes a memory device, further comprising the step of comparing said temperature measurement to a parameter stored in said memory device.

11. The method for the thermal treatment of a lumen using a medical apparatus according to claim 9, further comprising the step of reading said temperature measurement and wherein the movement of said light-emitting section is in response to said temperature measurement.

12. The method for the thermal treatment of a lumen using a medical apparatus according to claim 11, further comprising the step of adjusting the energy delivered to said treatment segment in response to said temperature measurement.

13. A method for the thermal treatment of a lumen using a medical apparatus including an energy delivery device having an optical fiber and a memory device comprising the steps of:

inserting optical fiber into a lumen at a treatment site, said treatment site comprising at least two treatment segments;

aligning light-emitting section of said optical fiber with a first treatment segment within said treatment site;

emitting energy into said lumen at said first treatment segment;

measuring a temperature of said lumen at said first treatment segment;

moving light-emitting section of said optical fiber to at least a second treatment segment within said lumen;

emitting energy into said lumen at said second treatment segment; and

measuring a temperature of said lumen at said second treatment segment.

14. The method for the thermal treatment of a lumen using a medical apparatus according to claim 13, wherein said light-emitting section is aligned with a treatment segment visually using light emitted from a marker laser.

15. The method for the thermal treatment of a lumen using a medical apparatus according to claim 13, wherein said light-emitting section is moved manually.

16. The method for the thermal treatment of a lumen using a medical apparatus according to claim 13, wherein said lumen is a vein.

17. The method for the thermal treatment of a lumen using a medical apparatus according to claim 13, further comprising the step of:

storing a temperature target in said memory device; and  
comparing the temperature measurement to said temperature target stored in said memory  
device.

18. The method for the thermal treatment of a lumen using a medical apparatus according to  
claim 17, further comprising the step of adjusting the energy delivered to said treatment segment  
in response to the temperature measurement.

19. The method for the thermal treatment of a lumen using a medical apparatus according to  
claim 18, wherein said treatment site comprises a multiplicity of treatment segments and said  
light-emitting section of said optical fiber is moved from one treatment segment to another in  
response to the temperature measurement.

20. The method for the thermal treatment of a lumen using a medical apparatus according to  
claim 18, wherein the energy delivered at the treatment segment is automatically adjusted using a  
main processor.